SYNTHESIS AND CHARACTERIZATION OF $ZnAlCO_3$ – LAYERED DOUBLE HYDROXIDE (LDH)

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ABSTRACT

$ZnAlCO_3$-Layered Double Hydroxide with cationic ratio of 2, 3 and 4 were synthesized by the co-precipitation method with pH 10 at room temperature. The LDH were characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM) and Atomic Absorption Spectroscopy (AAS). Infrared spectroscopy revealed that the characteristic layered double hydroxide structure is not fully destroyed. In the spectrum, it shows that the water bending modes are situated around 1600-1700 cm^{-1} accompanied by OH-stretching vibrations in the range of 3000-4000 cm^{-1} region. The x-ray diffraction patterns showed that the interlayer spacing distances increased from 0.7600 nm to 0.7682 nm and 0.7694 nm as increasing the ratio respectively. XRD data indicated that increased the ratio will decreased the intensity that result in decrease the crystallinity. The SEM image clearly shows that the LDH particles are mainly composed of irregular particles before and after adsorption process. The Atomic Absorption Spectroscopy (AAS) was effectively used to determine the percentage metal adsorption by the $ZnAlCO_3$-LDH at different ratio and different contact hour. A selectivity series can be determined for $ZnAlCO_3$ layered double hydroxide with molar ratio 2, 3 and 4: Cu> Pb> Cd.